Geo-Targeted Alerting System (GTAS)

NOAA - FEMA Joint Project

GTAS Inception

Executive Order 13407 signed June 26, 2006 began the development of the Integrated Public Alert and Warning System (IPAWS) which includes the ***Geo-Targeted Alerting System***

GTAS Primary Objective

- Determine How Toxic Plume Dispersion and Advanced Weather Information Can Be Disseminated From WFOs For Use By State And Local Government Emergency Preparedness Agencies
- Establish GTAS Requirements for AWIPS II

Demonstrate Proof-of-Concept GTAS Capabilities

- Deploy GTAS to Four WFOs & Their Respective State/Local Emergency Operations Centers
  - Southern Region - Dallas/FT Worth
  - Western Region - Seattle
  - Central Region - Kansas City
  - Eastern Region - New York City
    - Washington DC run from NOAA Headquarters

GTAS 2009 Budget

- Global Systems Division $1.850M
- National Weather Service $250K
- Air Resources Laboratory $125K
- National Ocean Services $75K
- Total $2.3M

GTAS Project Staff

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GTAS WEB Site

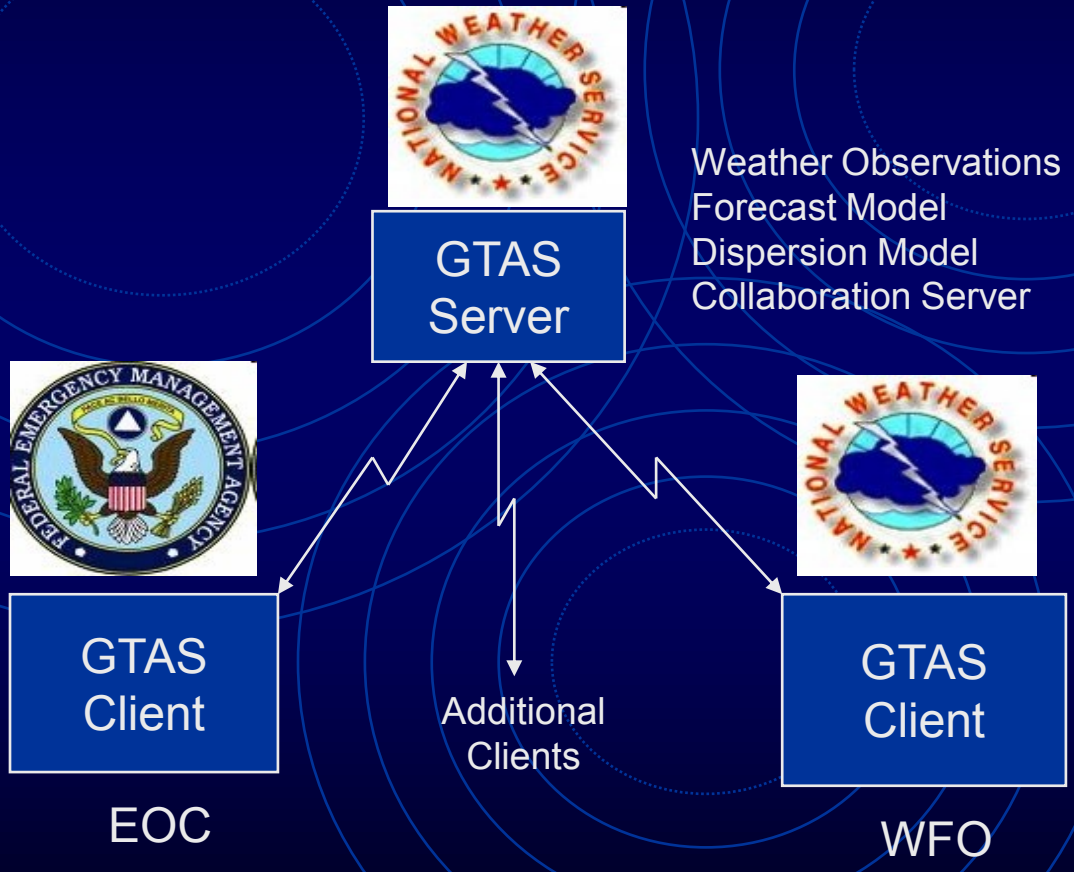
http://fxc.noaa.gov/GTAS

Technical Development

GTAS System Integration

Herb Grote

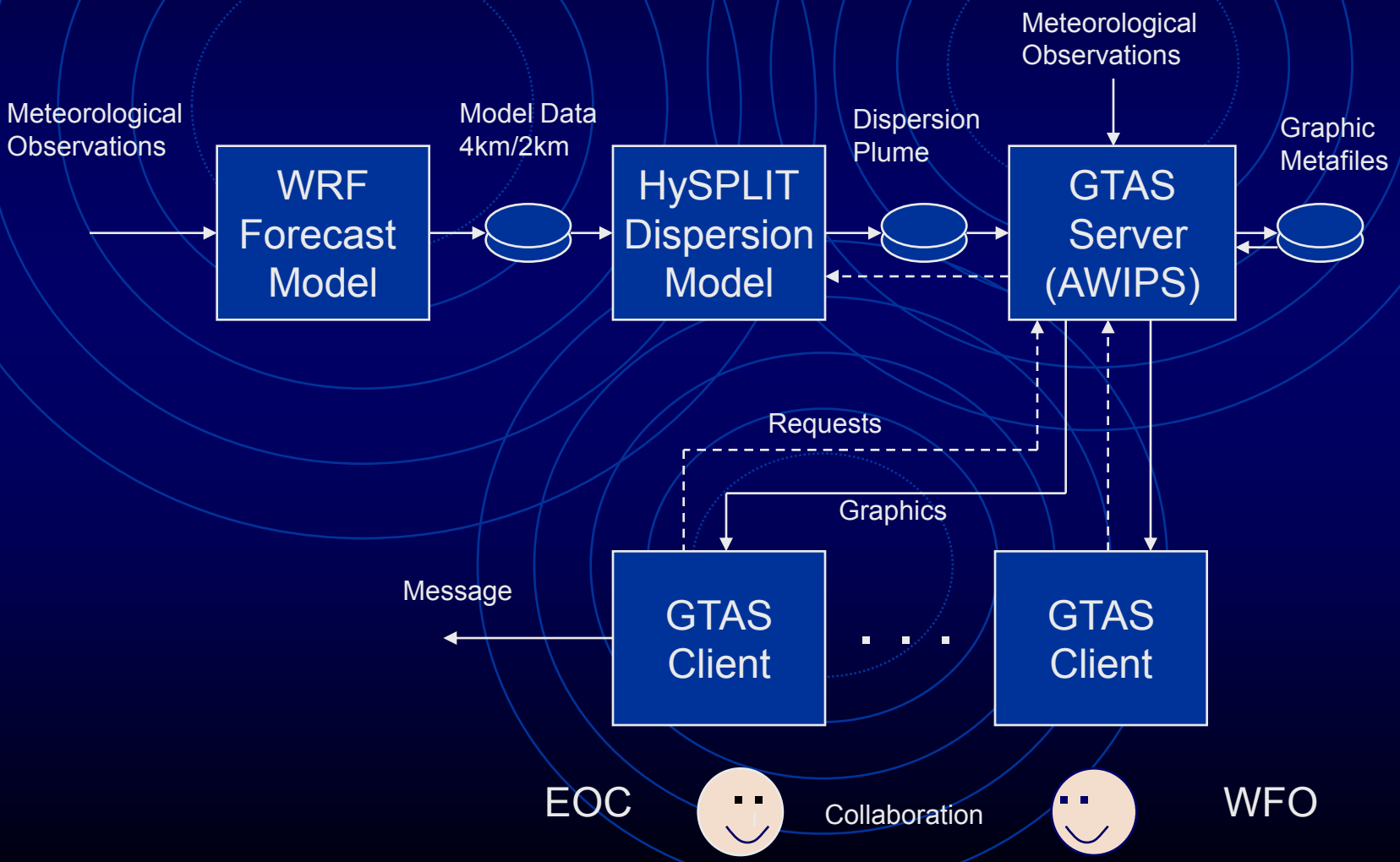
System Concept



Major GTAS Subsystems

- WRF/NMM
  High Resolution Weather Forecast Model
- AWIPS/IGC
  Real-time Weather Observations
- HYSPLIT
  Dispersion Model
- FXC
  EOC and WFO Display System

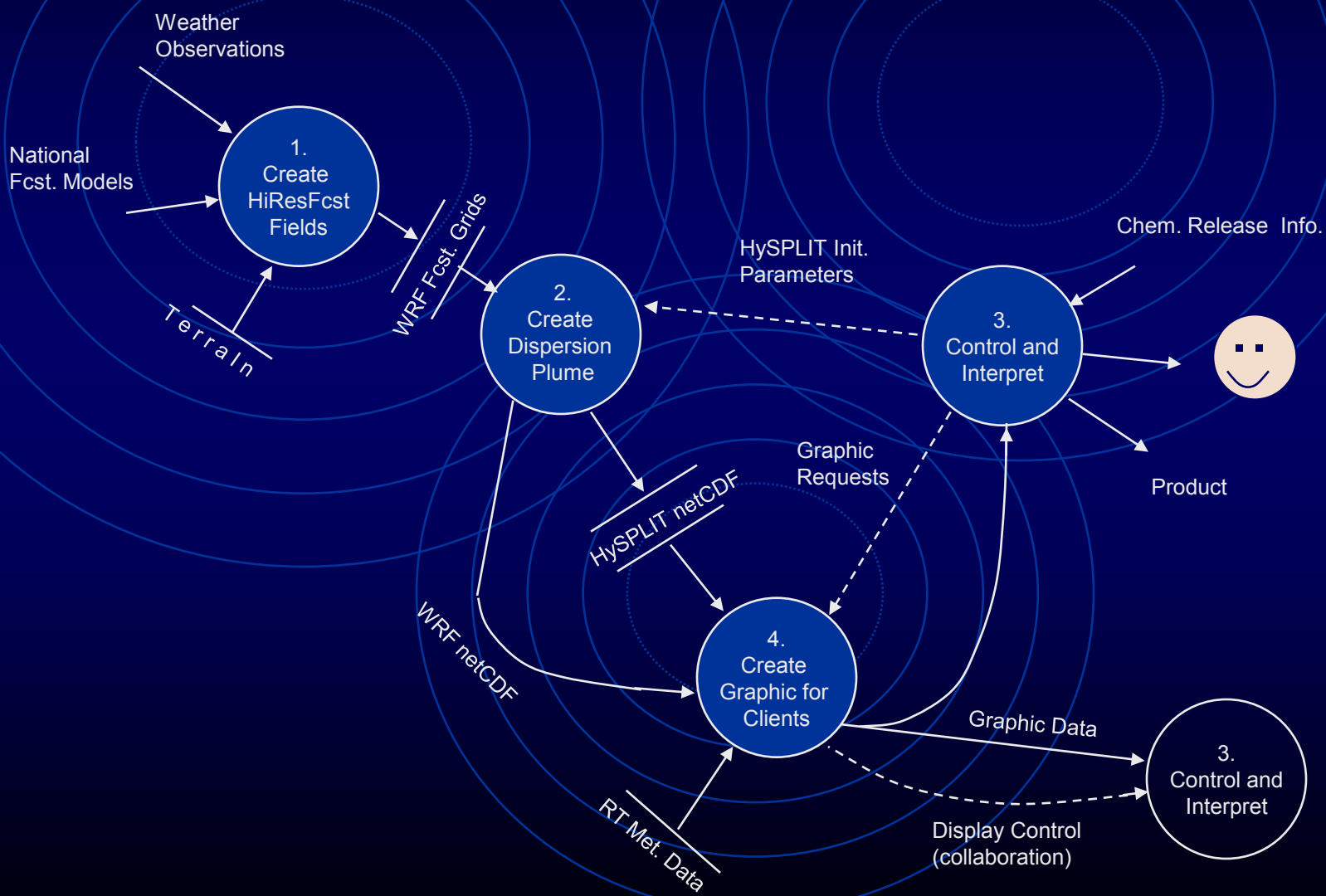
Basic System Architecture



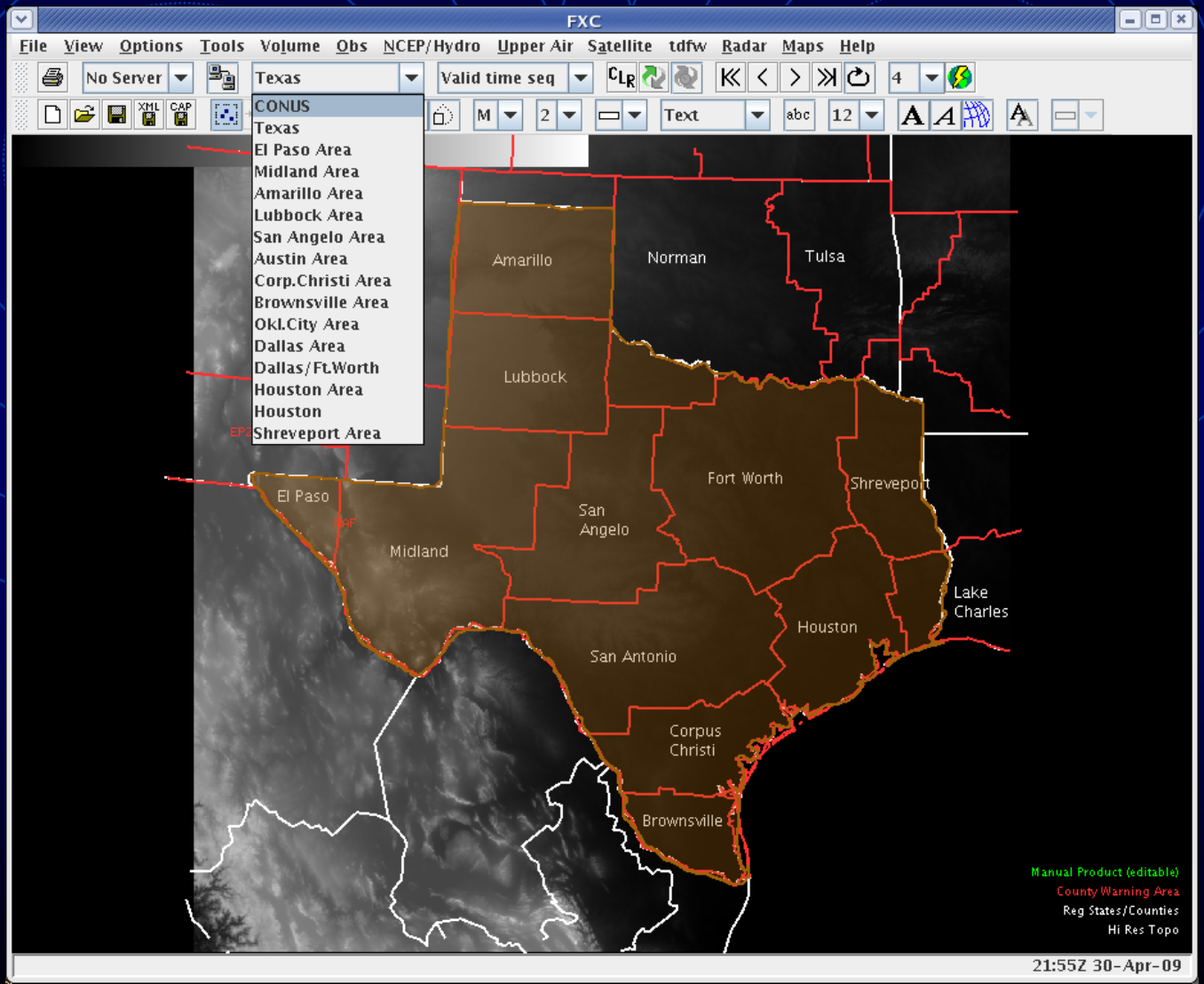
Basic GTAS Features

- Real-time Weather Display
- HYSPLIT Dispersion Model
- Collaboration (EOC, NWS, …)
- GIS Database (shapefiles)
- Graphic Annotation / Alert Polygon
- Dissemination
  - CAP, R911, Web Image, KML

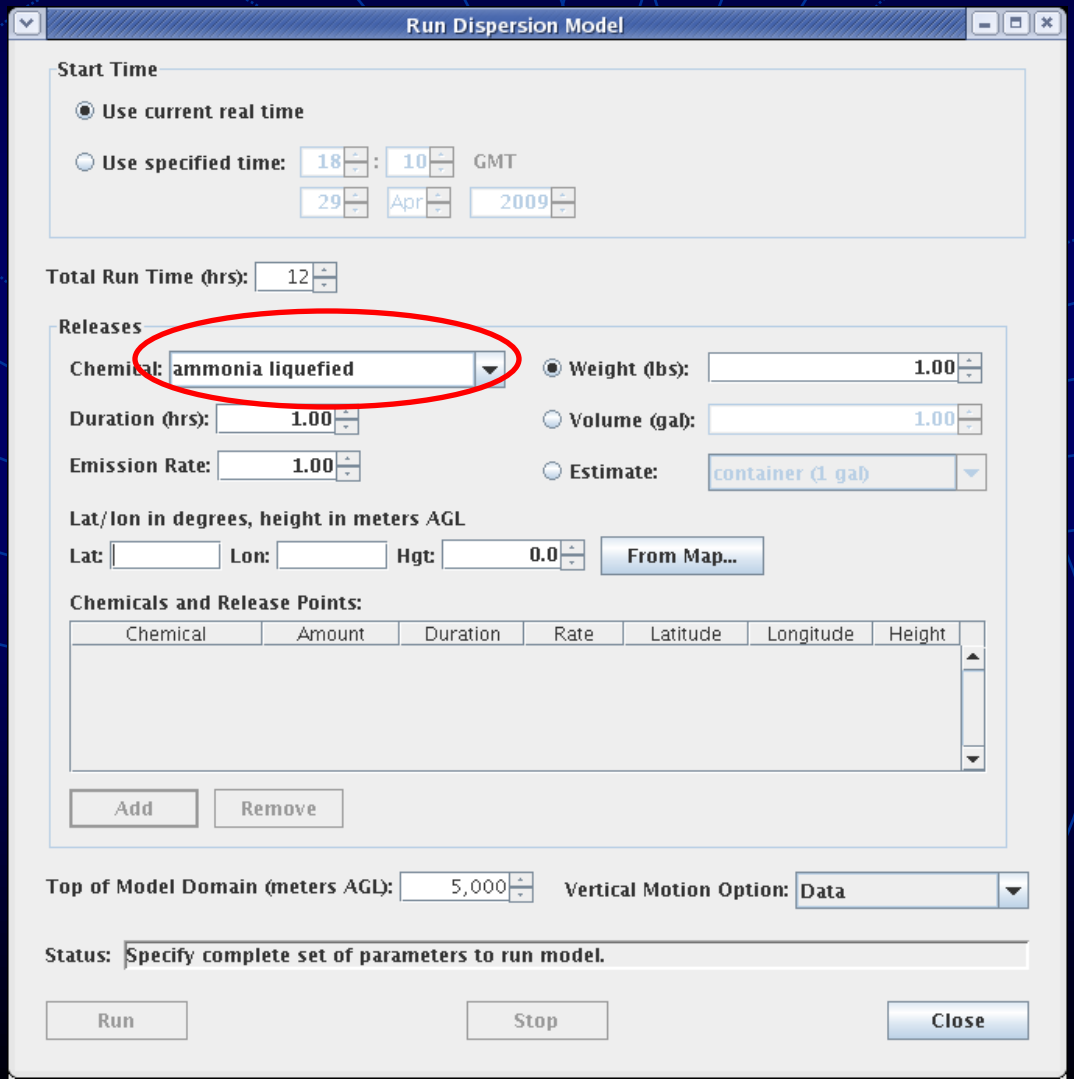
GTAS Data Interfaces

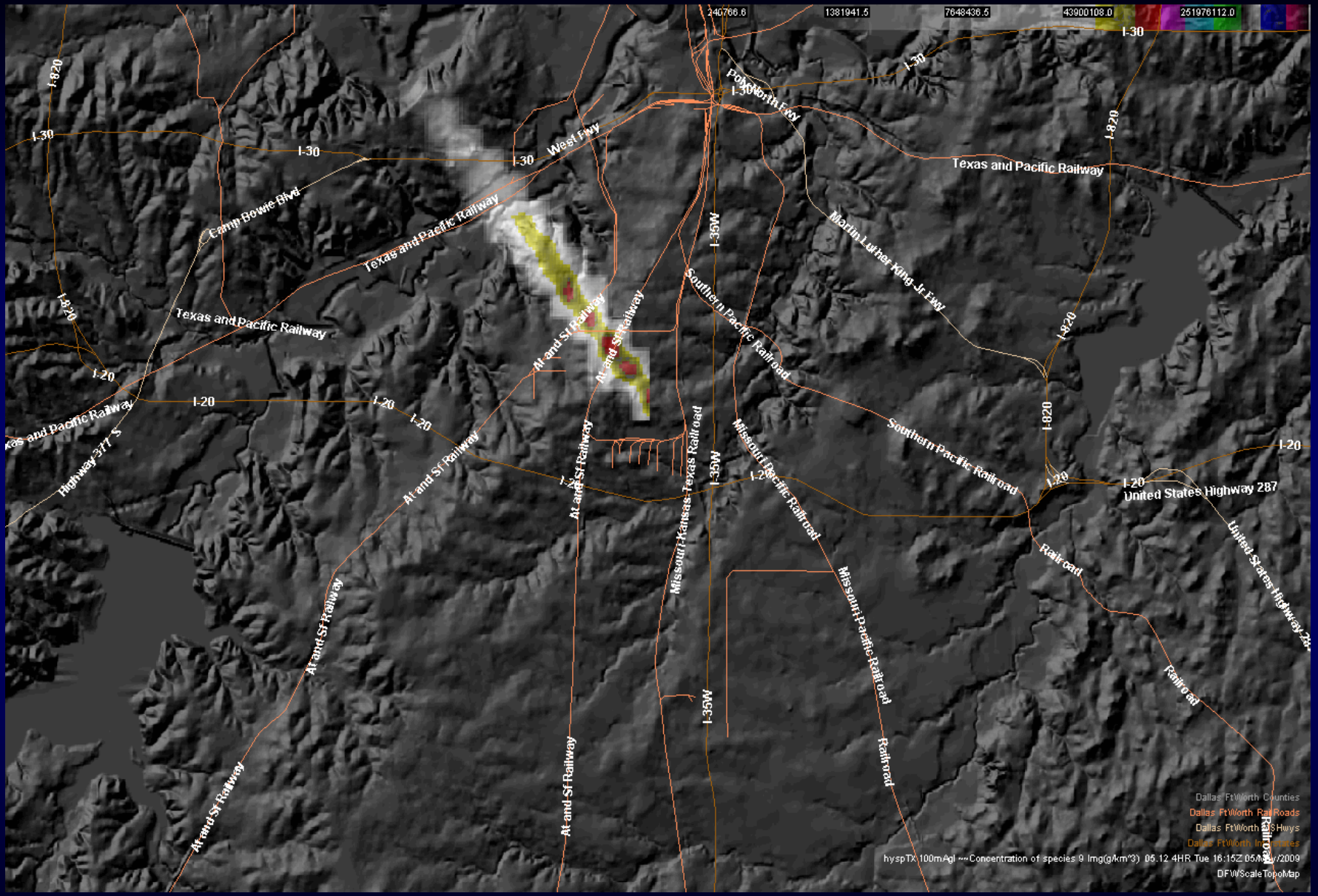


Texas Domain



HYSPLIT User Interface




240766.6
1381941.5
7648436.5
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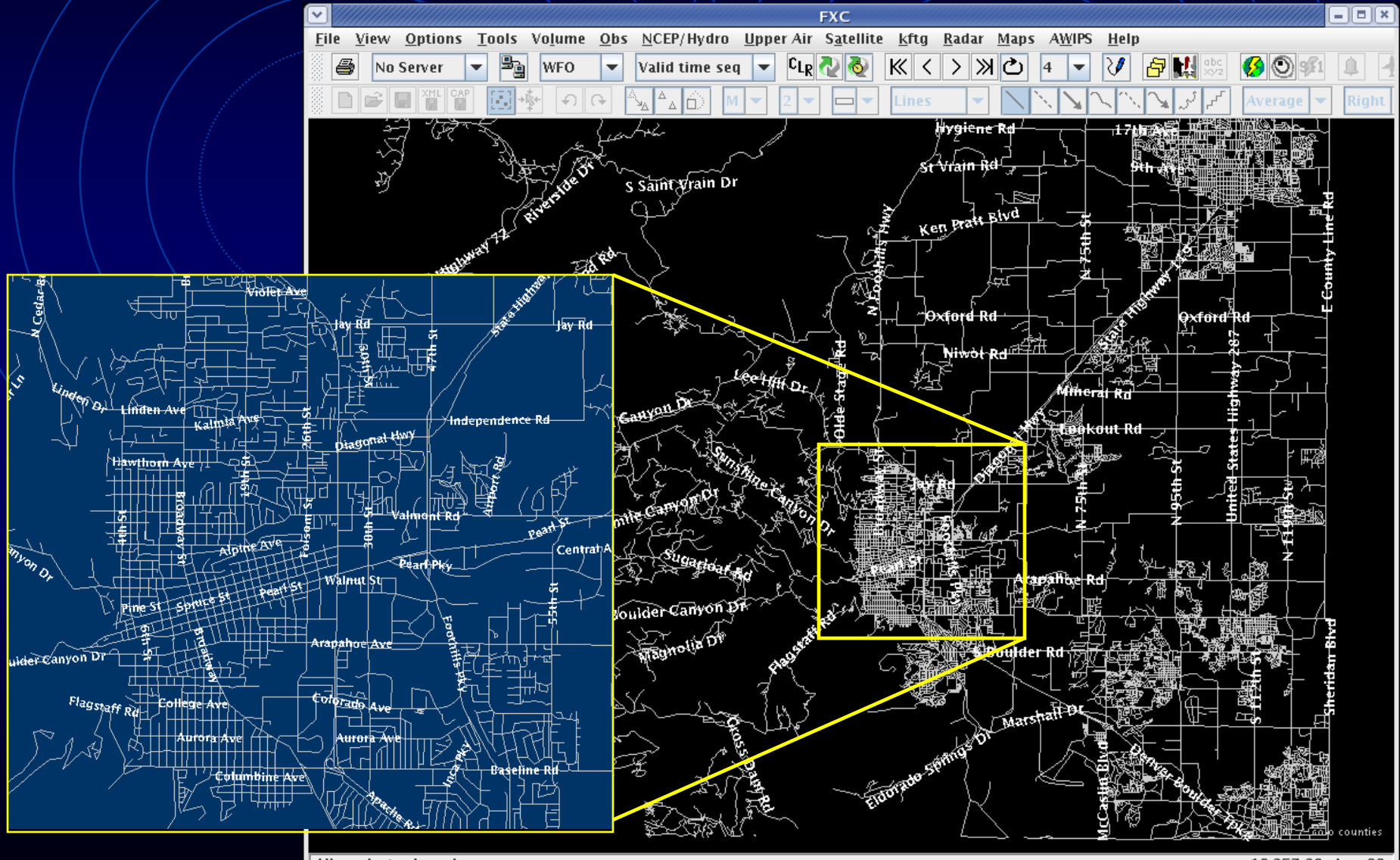
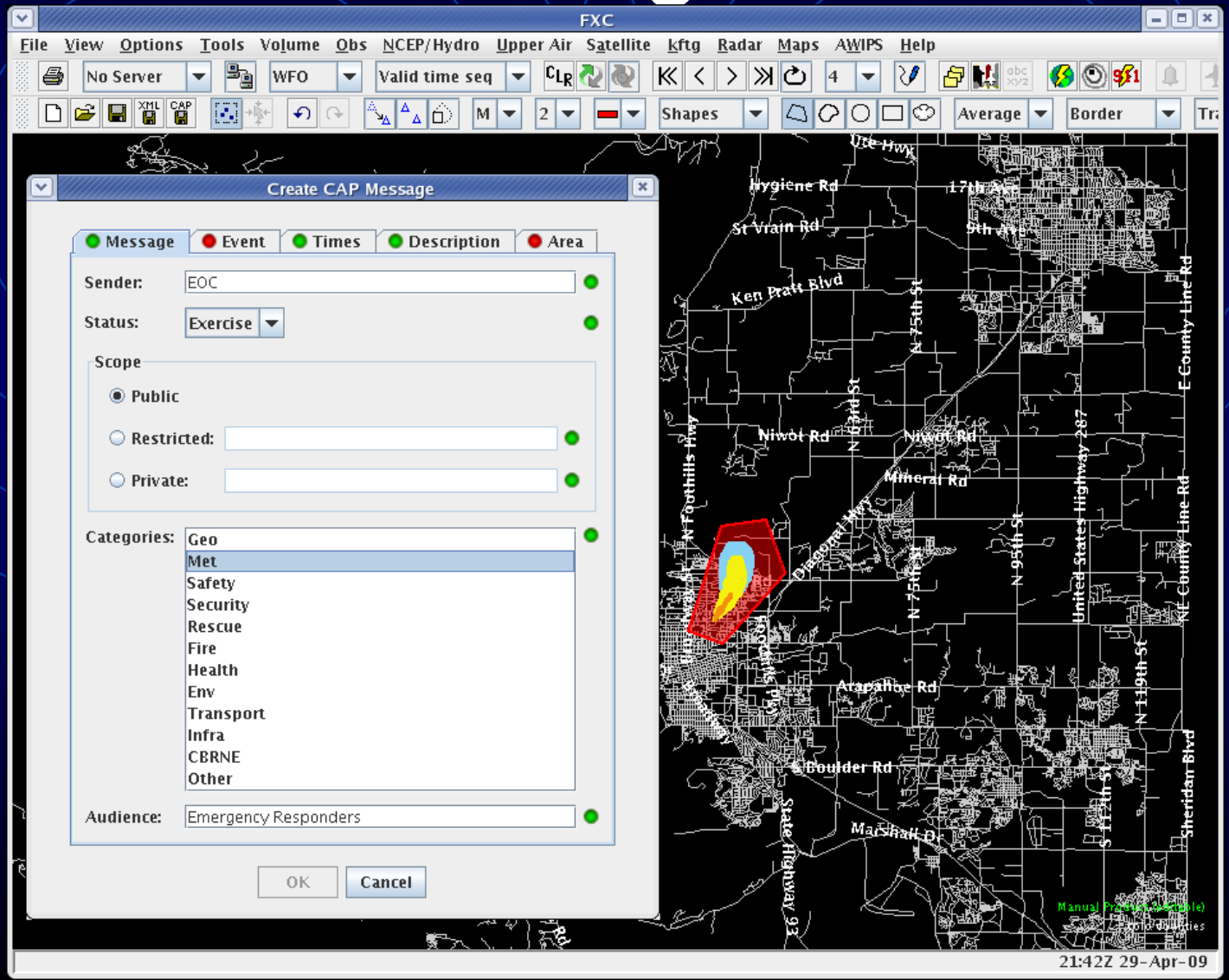
I-30
I-820
I-20
I-35W
West Fwy
Texas and Pacific Railway
Camp Bowie Blvd
Martin Luther King Jr Fwy
Southern Pacific Railroad
At and Sf Railway
Missouri Kansas Texas Railroad
Missouri Pacific Railroad
Railroad
United States Highway 287
Highway 377 S
Dallas FtWorth Counties
Dallas FtWorth Rail Roads
Dallas FtWorth US Hwys
DFWScaleTopoMap

Shapefile Display



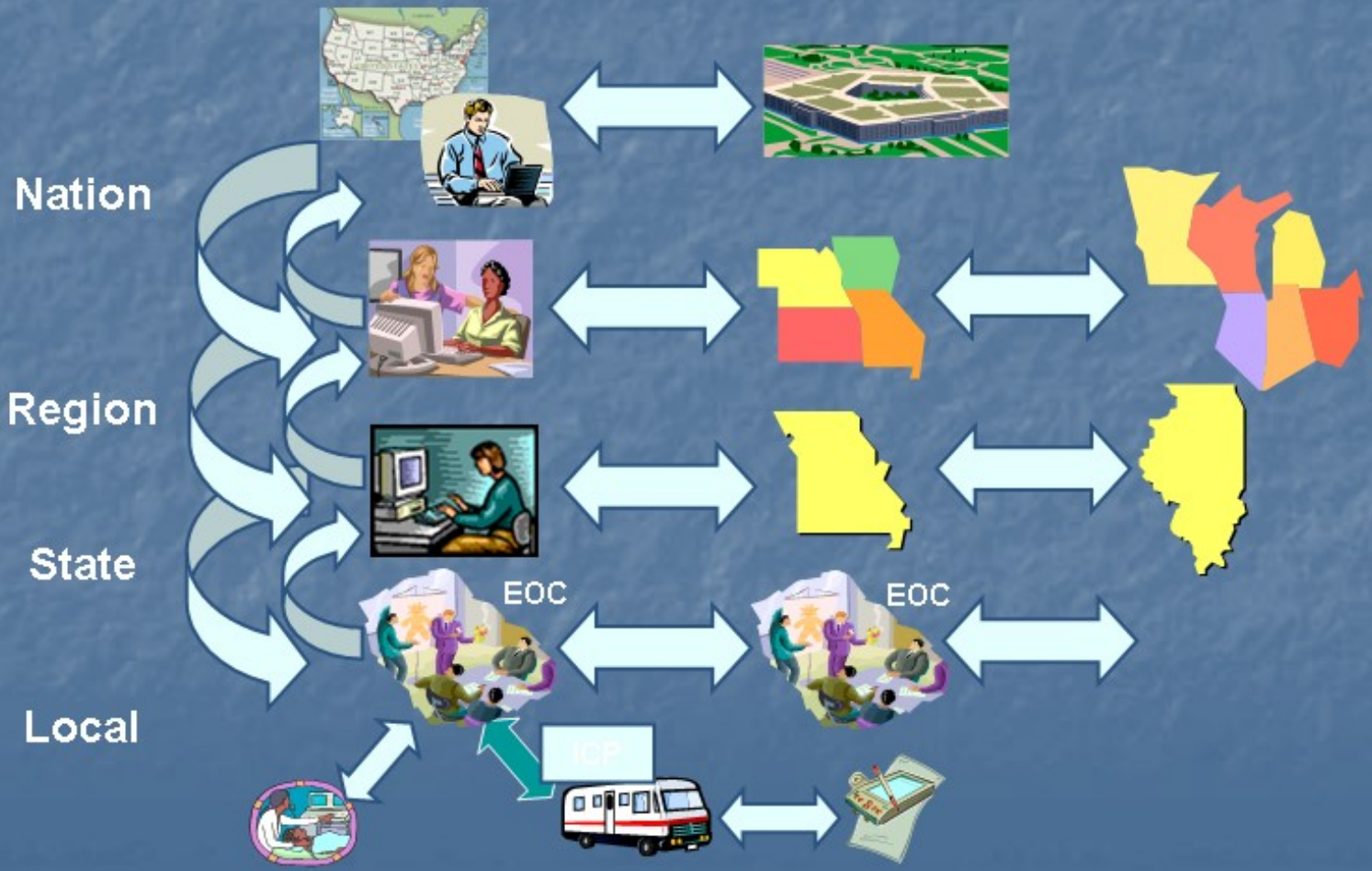
CAP Message Menu



DISASTER MANAGEMENT
INTEROPERABILITY SERVICES

Brief History
Responder's Vision

- Leverage technology to gain efficiency
- Develop a national emergency information interoperability service enabling horizontal and vertical data sharing



GTAS Security

- Client and server behind network firewalls
- Single server port opened
- Server port restricted to specific clients
- Network address translation / port forwarding
- Keys & certificates for R911 https

Technical Development

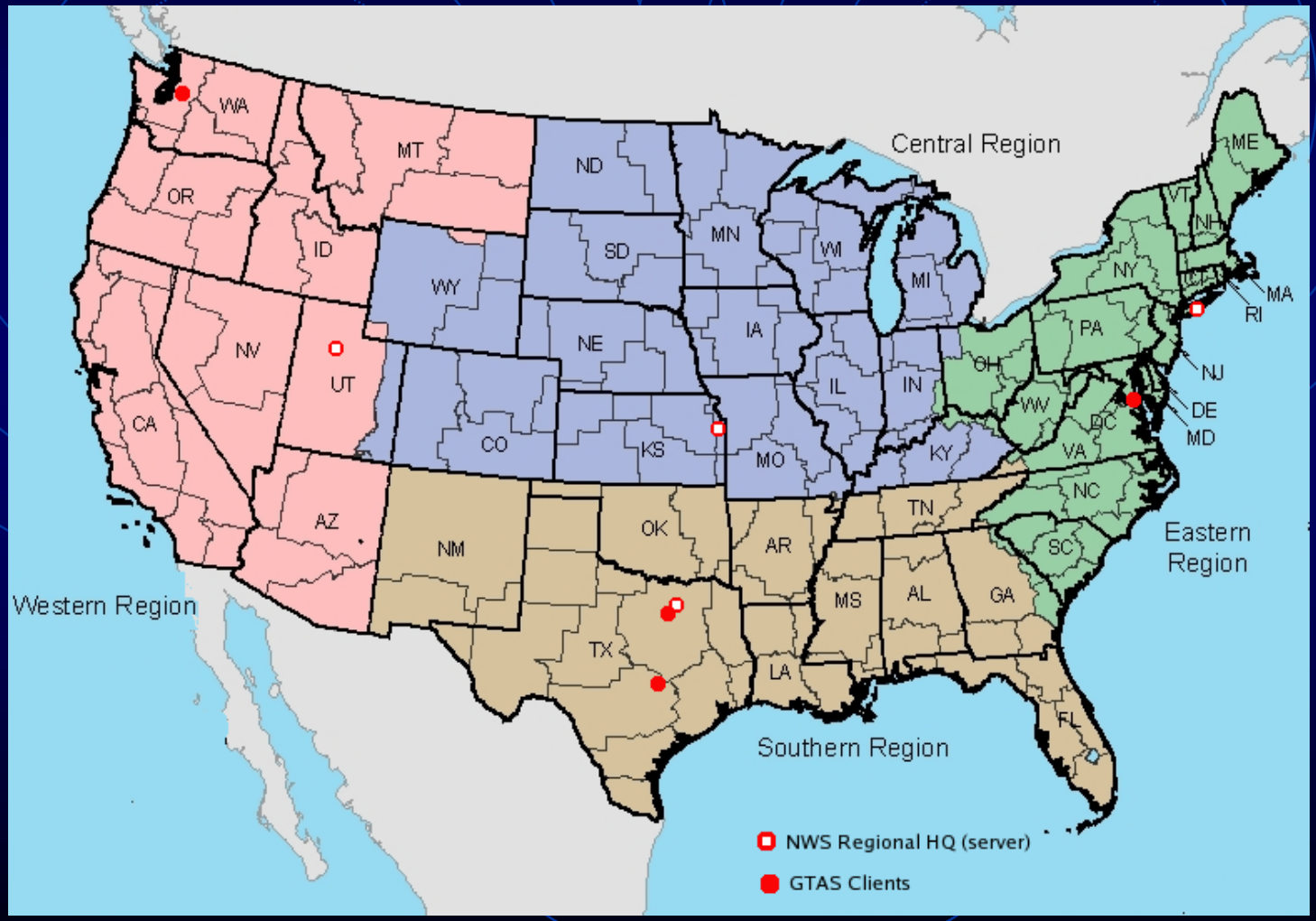
GTAS Deployment

Greg Pratt

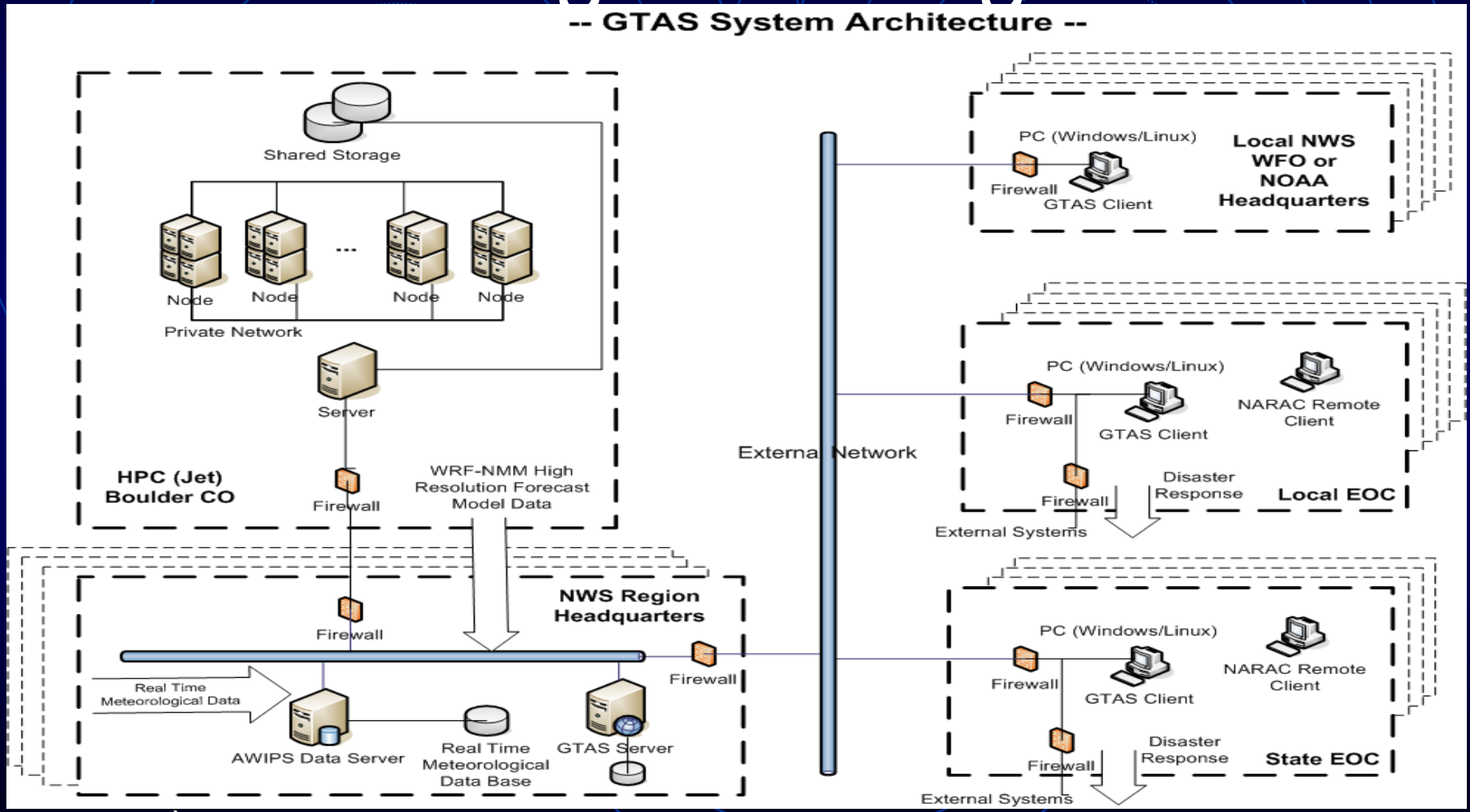
GTAS Prototype Pilot Sites

- Site participation is voluntary.
- Client sites must supply their own hardware.
- Client system must have access to the internet.
- Client sites must be willing to work with us to resolve firewall issues.

GTAS Deployment



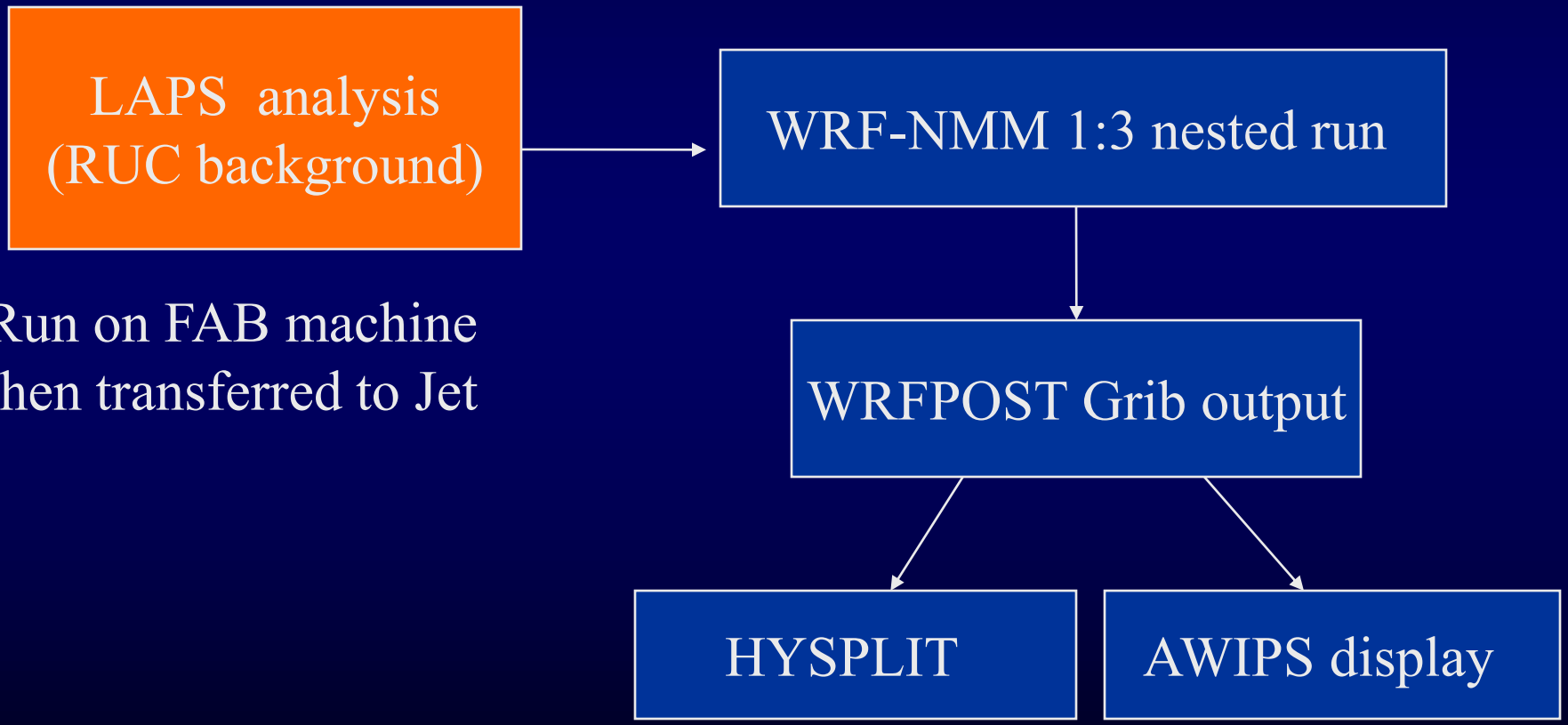
GTAS Region Configuration



GTAS Analysis and Modeling Activities

Isidora Jankov, Steve Albers, Linda Wharton and Paula McCaslin

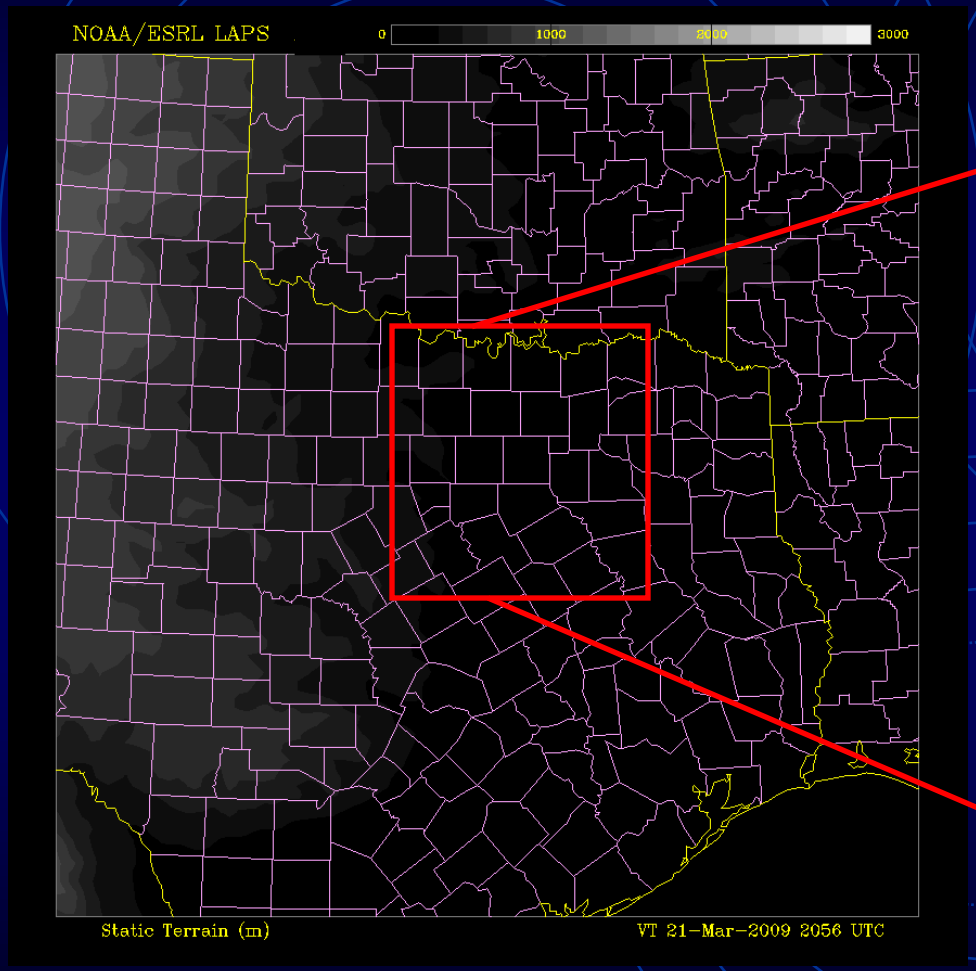
Numerical integrations are initialized with LAPS and performed by using WRF-NMM

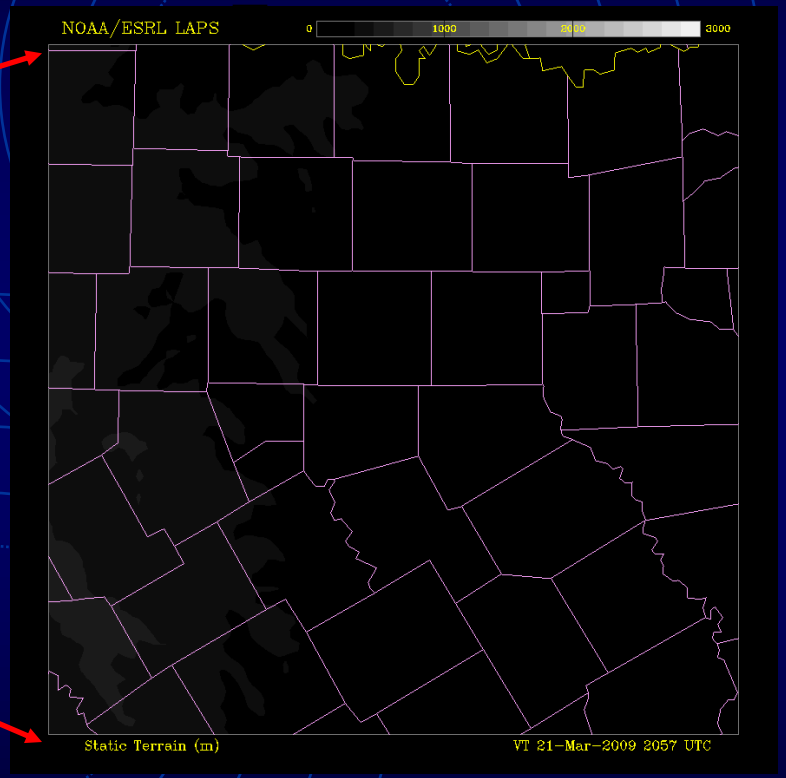


Run on FAB machine
then transferred to Jet

Running on Jet using dedicated nodes

The first test domain: NWS Southern Region Centered Between Dallas and Fort Worth

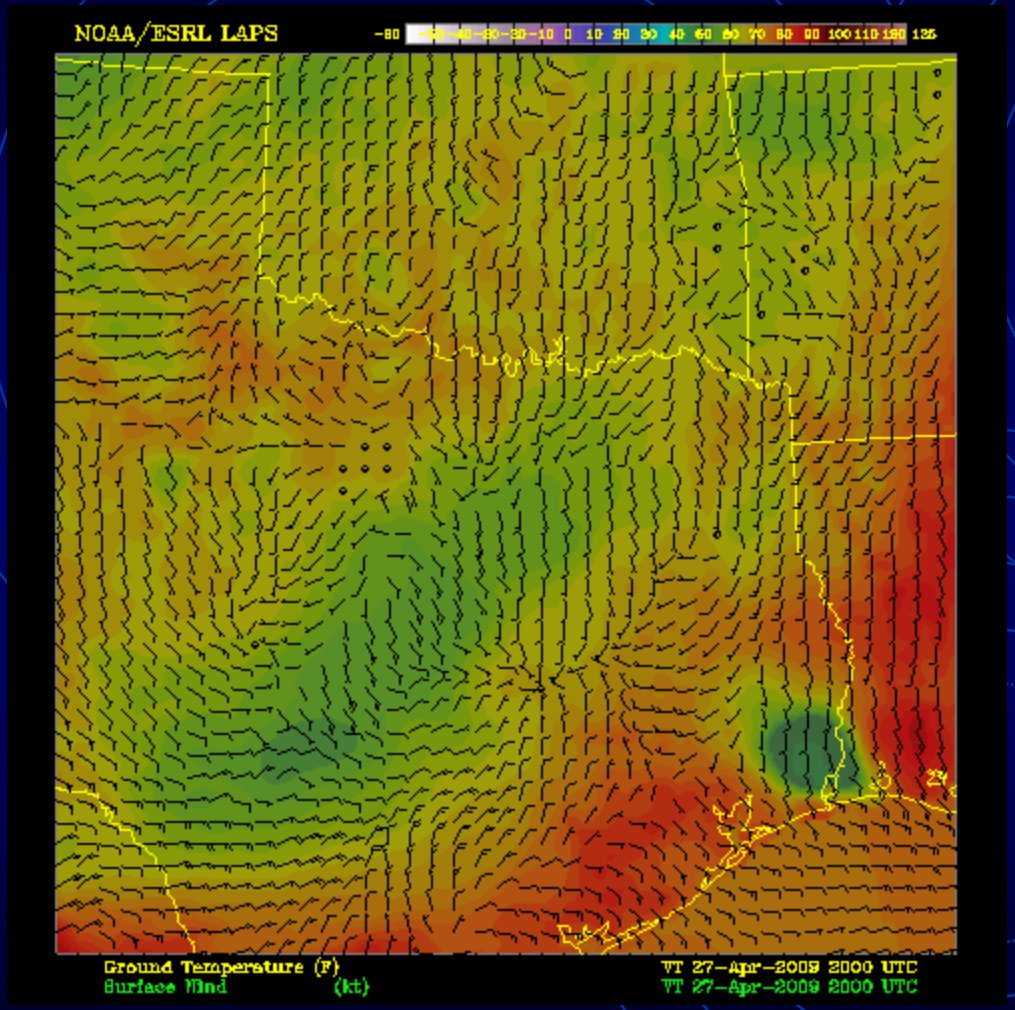




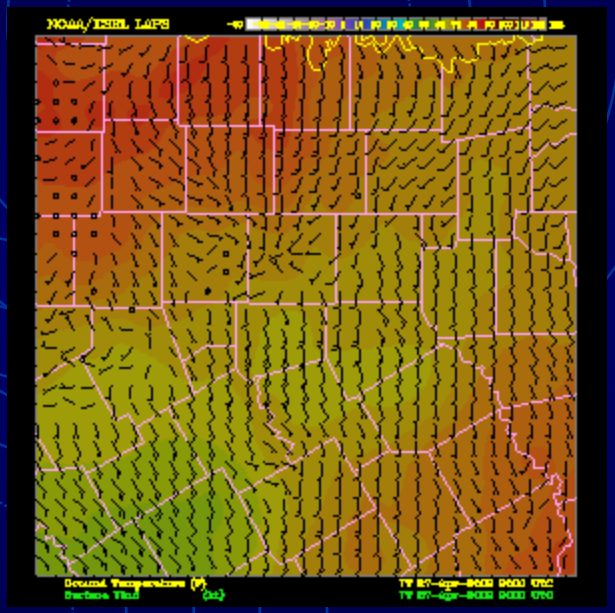
4.5 km

1.5 km nest

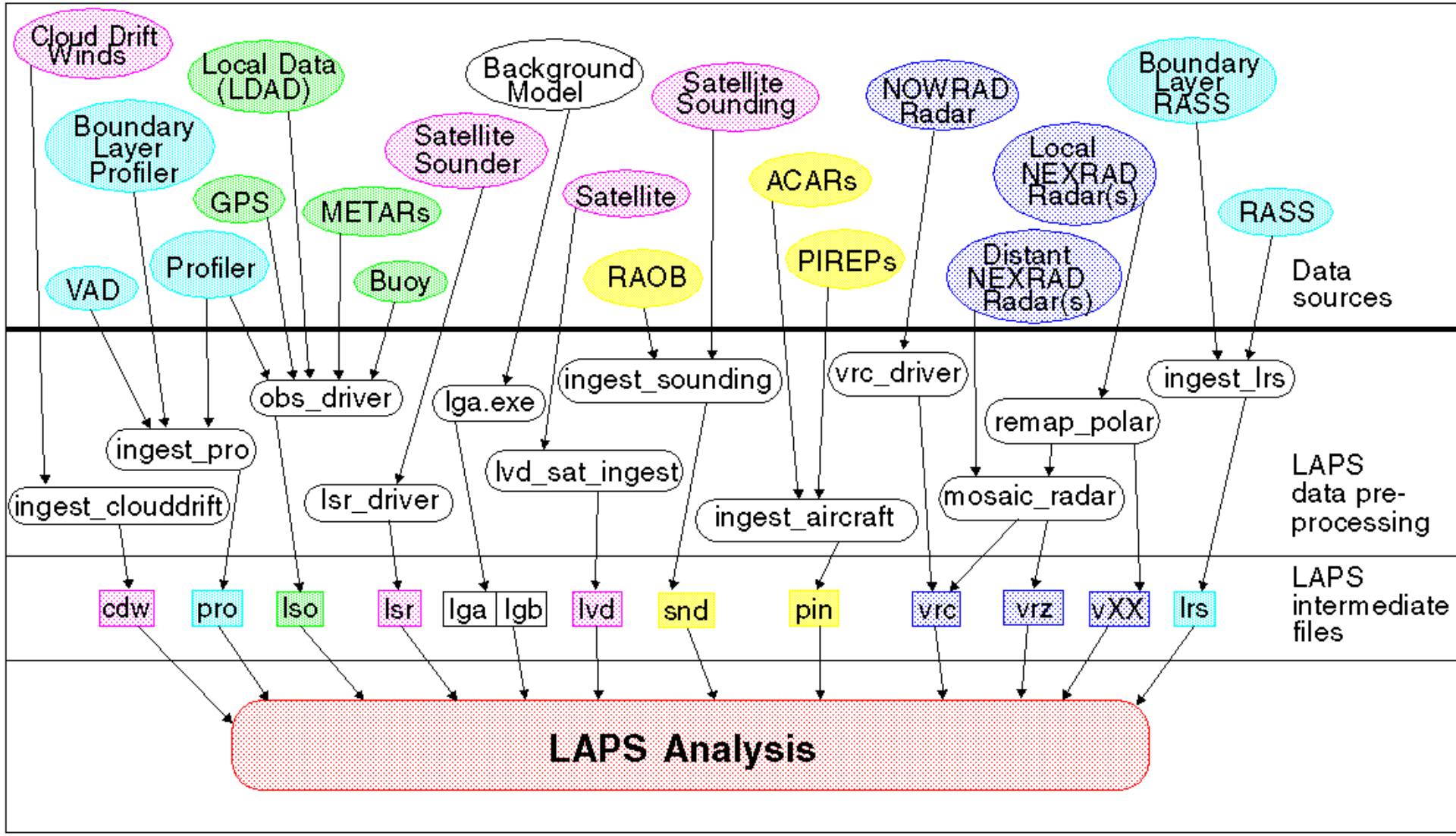
LAPS surface temperature and Wind analysis
Valid at 20 UTC 27 April 2009



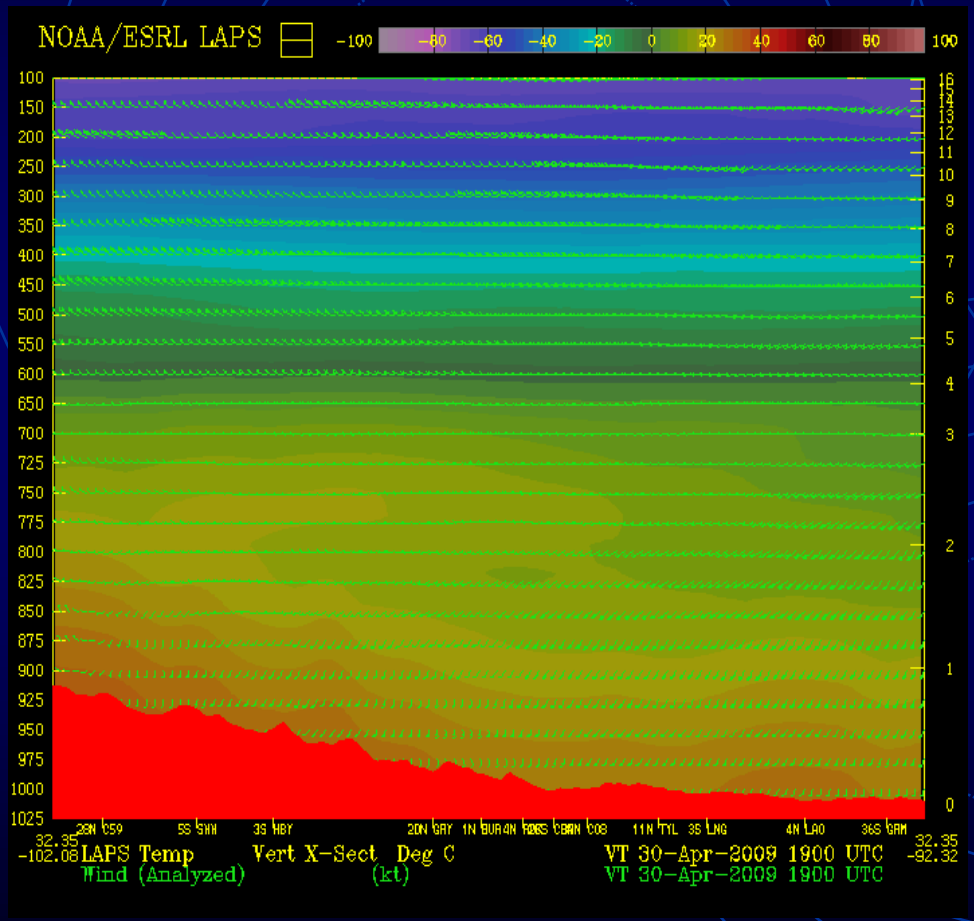
4.5 km

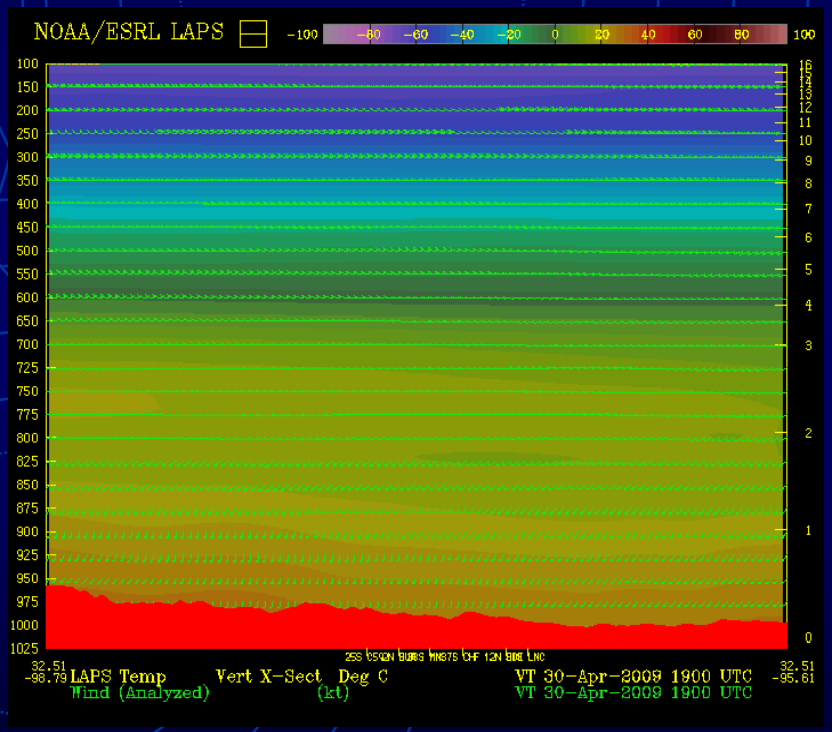


1.5 km nest


Cloud Drift Winds
Local Data (LDAD)
Background Model
Satellite Sounding
NOWRAD Radar
Boundary Layer RASS
Boundary Layer Profiler
Satellite Sounder
Local NEXRAD Radar(s)
GPS
METARs
Satellite
ACARs
RASS
Profiler
RAOB
PIREPs
Distant NEXRAD Radar(s)
VAD
Buoy
Data sources
obs_driver
lga.exe
ingest_sounding
vrc_driver
ingest_lrs
remap_polar
ingest_pro
lvd_sat_ingest
ingest_clouddrift
lsr_driver
mosaic_radar
ingest_aircraft
LAPS data pre-processing
cdw
pro
lso
lsr
lga
lgb
lvd
snd
pin
vrc
vrz
vXX
lrs
LAPS intermediate files
LAPS Analysis

Vertical XSCTs of wind and temperature analysis for the 4.5 km domain and 1.5 km nest





SOUTHERN REGION MODEL RUN SPECIFICS

Outer nest: 4.5 km horizontal grid spacing and 38 vertical levels (140x280) pts

Inner nest: 1.5 km horizontal grid spacing and 38 vertical levels (140x280) pts

The outer model nest is initialized using LAPS

Currently running in real time with 3-hr cycle

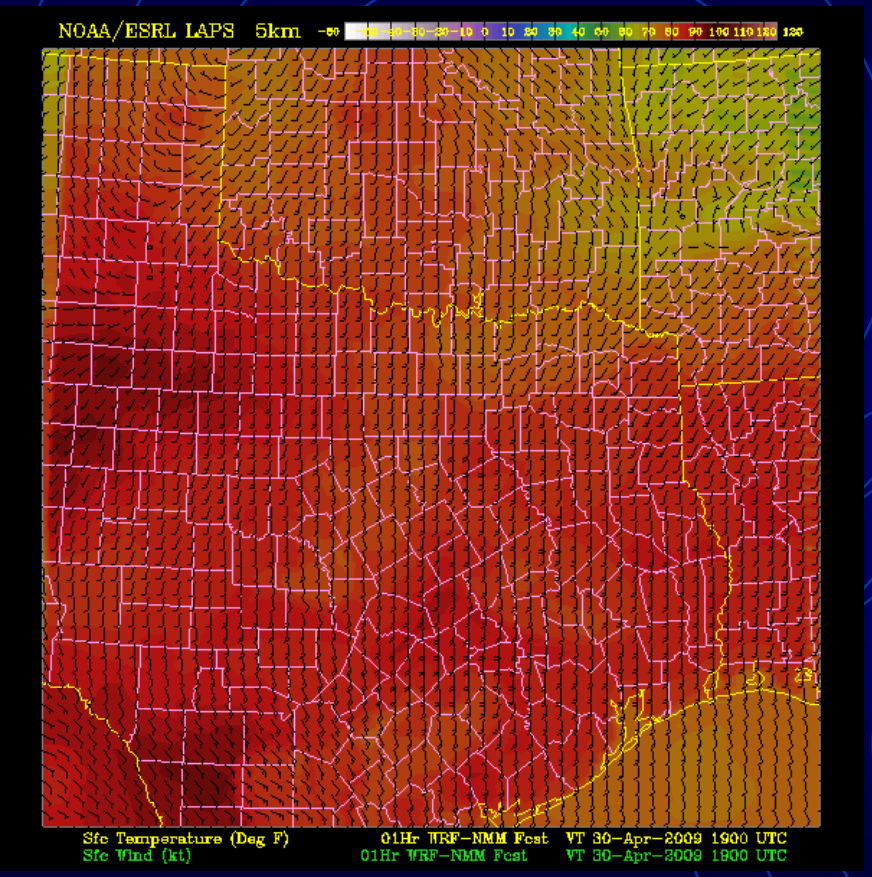
NAM 12-km is used for Lateral Boundary Conditions

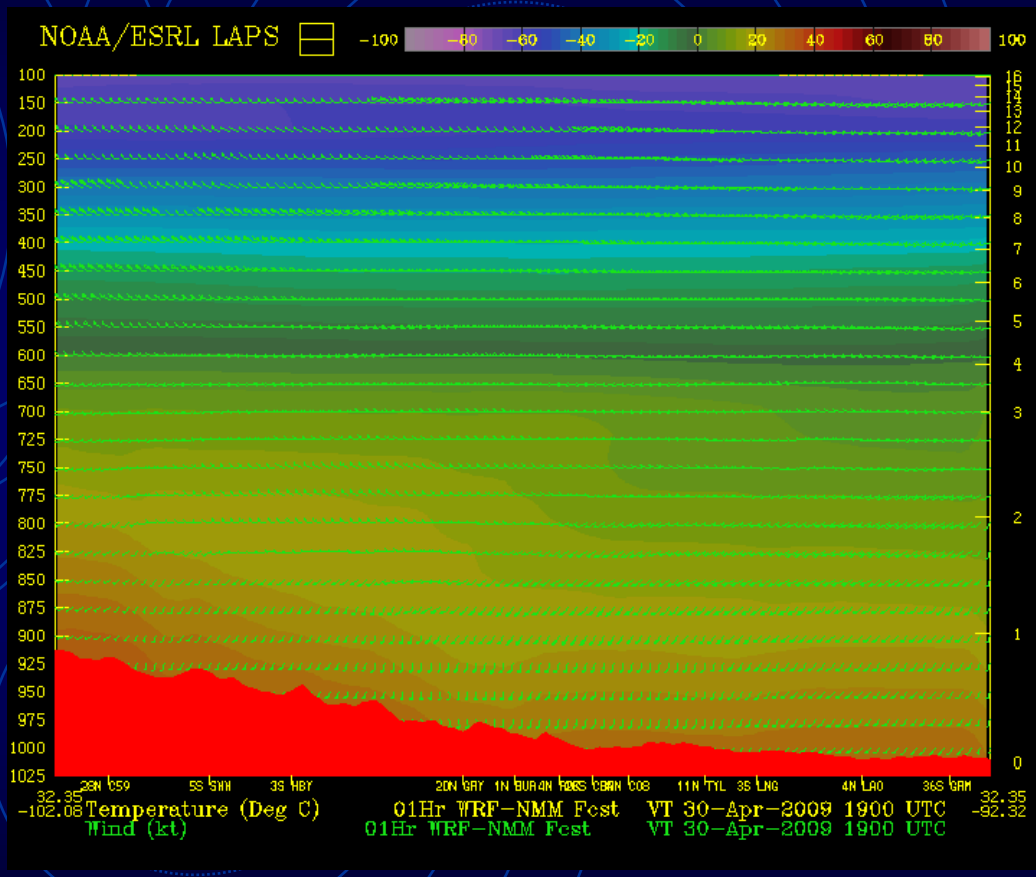
24 forecast hours and output every 30 minutes

Currently by using 56 CPUs it takes ~40 minutes for 24 hr long forecasts to run.

The plan is to have model (nested runs) for Western Region (Seattle), Central Region (Kansas City), and Eastern Region (NYC and Washington D. C.)

1-hr WRF-NMM forecast of surface temperature and temperature-wind XSC





BREAK

DEMO

Geo-Targeted Alerting System (GTAS) Training, Testing & Evaluation

Leigh Cheatwood-Harris

Cooperative Institute for Research in the Atmosphere (CIRA)
Colorado State University,
Fort Collins, Colorado USA, and
NOAA Earth System Research Laboratory (ESRL)
Boulder, Colorado USA

Outline:

GTAS System Training

GTAS System Testing

GTAS System Evaluation

GTAS System Documentation

GTAS System Training

Objectives:

To familiarize users of the following….

GTAS System Operations Concept

FX-Collaborate (FXC) User Interface

HySPLIT Dispersion Model

GTAS System Training

Approach:

3 STEPS…

Pre-Deployment Training

- Conducted remotely via GoTo Meeting and conference call approx. 2 weeks before Post-Deployment Training
- Overview
- Multiple training sessions possible per Site
-Training Participants - WFO Forecasters, EOC EMs

Post-Deployment Training

- Post GTAS System installation
- On-Site training at each WFO and EOC
- Multiple training sessions possible per Site
- Training subjects include…
  - GTAS System Operations Concept
  - FX-Collaborate (FXC) User Interface
  - HySPLIT Dispersion Model

Recurring Training

- Conducted remotely via GoTo Meeting and conference call on a monthly basis for each site
- Hazard Emergency Training Scenarios

GTAS System Training

Personnel Requirements:

Training Staff

GSD Personnel
Air Resources Laboratory (ARL) Personnel

Support Staff

Personnel at each WFO and EOC
Personnel at NWS Regional Headquarters

WFO Forecasters

EOC Emergency Managers

GTAS System Testing

Objectives:

Verify GTAS System is operationally ready

GTAS NWS Regional Server Testing

GTAS Client Testing

GTAS System Testing

GTAS NWS Regional Server:

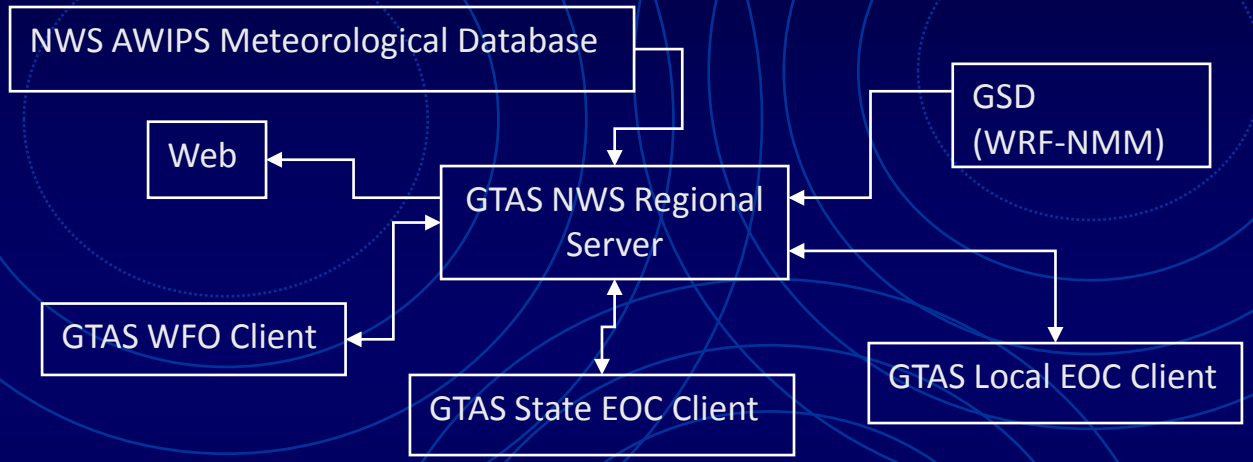


Figure 1: GTAS System Testing Diagram - Components

Check List –

AWIPS Meteorological Database accessible?

Real-time WRF-NMM Model data being ingested?

Running and able to accept remote connections from the GTAS Clients collaboratively and independently?

GTAS System Testing

GTAS Client:

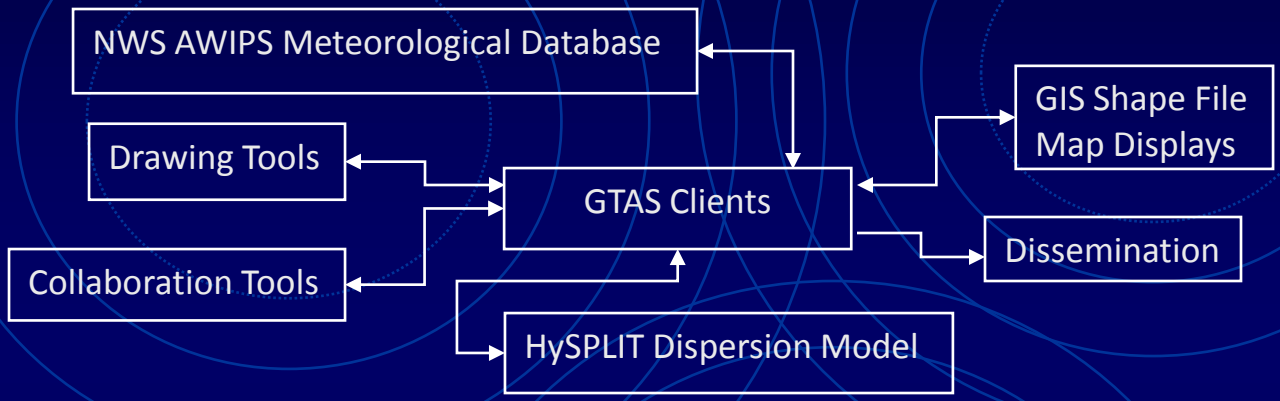


Figure 2: GTAS Client Testing Diagram - Components

Check List –

Can communicate with Server?
Can display real-time meteorological data?
Can display GIS Shape File Maps?
Can display and run HySPLIT?
Drawing and collaboration tools work?

GTAS System Evaluation

Evaluation Questions:

Does the GTAS System *provide* toxic plume dispersion and meteorological data *efficiently* and *effectively*?

Does the GTAS System *enhance relationships* between the WFOs and EOCs?

Is the GTAS System user interface *user-friendly* in order to assist the EOCs with their mitigation and response plans?

GTAS System Evaluation

Evaluation Methods:

- Online Questionnaires
- Interviews
- Observations
- System Logs

GTAS System Documentation

Report Preparation:

Provide Catalog of User Feedback and System Log Results

Provide Report Summarizing T&E Results and Recommendations for Future Deployment

Summary

Greg Pratt

FY09 – Dec 31, 2009

- 5 WRF-NMM areas defined and running at 4.5/1.5km every three hours here at GSD.

- 4 Regional GTAS Servers receiving WRF-NMM and AWIPS meteorological data (Southern, Western, Central, Eastern).

- 4 WFOs , local EOCs and state EOCs trained and coordinating/collaborating with GTAS client systems during real and staged events.

FY10

- Enhanced GTAS evaluation and report.
- Add six additional sites including the south eastern U.S. with added Hurricane applications.
- Improve systems based on feedback from users.

FY10

- Add WRF-Chem model.

- Work with western region on PDA delivery of meteorological and toxic dispersion displays.

- Work with southern region on defining NWS operational architectures for GTAS:
  - Virtual servers.
  - WRF-NMM model runs.

FY11 – FY13

- Improve systems:
  - More tightly coupled system to NARAC and other systems at EOCs.
  - Wet/Dry Chemical Deposition.
  - User feedback.
  - Understanding of needs.
  - New and emerging technologies.

- Provide NWS with GTAS requirements that will be added to OSIP.

Questions